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A sample of 448 self-admitted preservice barbiturate users was compared with a control sample of airmen with no known record of drug abuse. Within the sample of barbiturate users, several variables were examined to see if they were associated with degree of barbiturate use. The barbiturate sample differs significantly from the control sample in that barbiturate users are disproportionately represented in the North-Northeast and Far West-Pacific Coast enlistment areas; they more often indicate no religious preference; and they enlist at a younger age. Degree of barbiturate use is negatively associated with aptitude, educational level, and with measures of success in the Air Force. However, degree of barbiturate use is positively associated with the use of other drugs. (Author/NH)

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AIR FORCE HUMAN RESOURCES LABORATORY

AFHRL-TR-74-21

CORRELATES OF BARBITURATE USE

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March 1974
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PREFACE

The work reported in this study was accomplished under Project 7719, Air Force Personnel System Development on Selection, Assignment, Evaluation, Quality Control, Retention, Promotion, and Utilization; Task 771913, Research on the Impact of Socio-political Changes on Personnel Management Devices and Systems.

TABLE OF CONTENTS

		Page
I.	Introduction	5
II.	Method	5
	Drug Abuser (DA) Sample	5
	Control Sample	6
	Barbiturate (BA) Sample	6
	General Considerations About the Samples	6
	Variables	6
	Analysis	7
III.	Results and Discussion	7
	The Relationship of Barbiturate Use to the Use of Other Drugs	7
	The Relationship of Barbiturate Use to Background Characteristics	9
IV.	Conclusions	18
	References	19

LIST OF ILLUSTRATIONS

Figure		Page
1	Relationships between degree of barbiturate use and the use of other drugs	8
2	Barbiturate use in the North-Northeast (I), Mid-Atlantic-North Central (II), and South-Southwest (III) enlistment areas.	10
3	Barbiturate use in the Mid-West (IV) and Far West-Pacific Coast (V) enlistment areas	11
4	Barbiturate use by race	11
5	Barbiturate use by AFQT; Categories I and II vs Categories III and IV	12
6	Barbiturate use by AQE-M.	13
7	Barbiturate use by AQE-A	14
8	Barbiturate use by AQE-G	15
9	Barbiturate use by AQE-E	16

LIST OF TABLES

Table		Page
1	Heavy Barbiturate Users (Over 100 Uses) Who Are Light Users of Associated Drugs Compared to Heavy Users of Associated Drugs	9
2	Percentage Distributions of Barbiturate Users and Control Samples by Area of Enlistment	9
3	Percentage Distribution of Degree of Barbiturate Use of Three Levels of Education	17
4	Percentage Distribution of Barbiturate Users and Control Samples by Age at Enlistment	17
5	Comparison of Barbiturate Users and Control Samples by Religious Preference	17

List of Tables (*Continued*)

Table		Page
6	Comparison of Barbiturate Users and Control Samples by Duty Status	18
7	Comparison of Promotion Rate of Barbiturate Users and Control Samples by Grade	18

8

CORRELATES OF BARBITURATE USE

I. INTRODUCTION

Modern pharmacology has found few drugs so widely used and accepted for the treatment of psychological illness as those of the barbiturate family. First synthesized in the early 1900's, barbiturates have been widely used in the treatment of mental illness, both neurosis and psychosis.

Recently, there has been an increase in the use and abuse of barbiturates among the young drug cultists. The following are some of the reasons given for the increase: (1) an overproduction by manufacturers, (2) casual prescription by doctors, and (3) an imitation of adult behavior by the young. Marin and Cohen (1971) believe that easy access, a growing fear of the danger of other drugs, and the casual use of barbiturates by parents have conditioned the young to perceive the use of barbiturates as being a sociologically acceptable phenomenon.

Considering ready accessibility, Nowlis (1969) believes that barbiturate addiction is more dangerous than opiate addiction. Tolerance grows rapidly and severe dependence leads to convulsions, stupor, coma, or even death in cases of abrupt withdrawal. In addition, many narcotics addicts use barbiturates to offset withdrawal symptoms when there is a shortage of opiates, and other drug users employ barbiturates as a help to bring them "down" from a bad LSD "trip," and to stabilize themselves when "strung out" on speed (methamphetamines).

There have been many studies describing the physiological effects of barbiturates on the cortical regions of the brain. These regions are concerned with perceptual analyses, fine coordination of motor movements, thought processes, and memory. In 1969, Himwich and Shimizu reported that cortical depression was probably accomplished by a chemical reaction which increased the neuron threshold for stimulation, thereby causing perceptual distortion, loss of coordination, and even accidental overdose due to loss of memory of previous doses. Nowlis' (1969) research yielded information about mild doses of barbiturates. She reported subjects first experienced euphoria and disinhibition, then depression, much the same as subjects consuming moderate amounts of alcohol.

Most research on barbiturates has been biological or chemical in nature. Very little is known about the sociological correlates of the user. A few studies have been done using mentally deviant groups or specialized groups such as college students (Blum, 1969). Blum's studies report that, in the five colleges he sampled, there were no significant differences between characteristics of barbiturate and non-barbiturate users. He also reported that barbiturate users tend to be as politically conservative as those who use no drugs at all, including tobacco and alcohol. Heavy users of barbiturates are twice as likely to have parents who use sedatives than non-barbiturate users. Blum states that, based on low intercorrelations with other drugs, the user of sedatives (barbiturates and non-prescribed sleeping aids) is more independent of other drug use than is the marijuana, hallucinogen, amphetamine, or opiate user.

The purpose of this study is to examine, on a broader and more general scale, the sociological correlates of barbiturate use. A population of Air Force basic trainees, ranging from 17 to 26 years of age, will be compared (users and control group) on various dimensions of aptitude, educational level, area of enlistment, and family background.

II. METHOD

Drug Abuser (DA) Sample

A sample of self-admitted pre-service drug users was obtained from the Drug Control Office (DCO) at Lackland AFB, Texas. Drug abusers were identified during 1970 (N = 1,471) and 1971 (N = 3,218), most within a short time of entering the service.

The DCO sample is drawn from those airmen that admitted drug use to Air Force agencies such as the Assessments Branch (Human Reliability Program), Mental Hygience Clinic, or to Squadron Commanders' at an incoming briefing. For this particular study, covering the period January, 1970 to September, 1971, the proportions are as follows:

Human Reliability Program - 74%
Squadron Commanders' Incoming Briefing - 16%
Mental Hygiene - 8%
Medical Referral - 1%
Security Police - 1%

For the time covered by our sample, policies affecting definition of a drug "user" remained

fairly stable. It was decided in May, 1970 to make no distinction between marijuana experimenters and users of other drugs among applicants for jobs in the Human Reliability Program. In August of 1971, AFR 30-19 was implemented, imposing strict disposition of pre-service drug users, but as of the time the last subject of the study was identified, pre-enlistment screening by recruiters in the terms of AFR 30-19 had not been implemented.

The DA sample is a somewhat biased group, being composed mainly of users that were applicants to the Human Reliability Program (HRP). This program, at the time the sample was collected, was available only to those basic airmen with higher than average Airman Qualifying Examination (AQE) scores. Therefore, the drug using group in this study has higher means on the AQE tests than the normal airman basic population.

Control Sample

Two control sample subjects with no known history of drug use were selected for each DA subject from the general personnel files, so that the control subjects were matched with the DA subjects on AQE-General Aptitude Index scores and on date of entry into the Air Force. AQE-G scores were used since the operational procedure of selecting applicants for the HRP was too complicated to be of practical use in matching the DA subjects and control subjects. Both samples should be about equally biased as compared to the general population of basic airmen. There are no known biases associated with any of the sources for the DA group except the HRP.

Barbiturate (BA) Sample

Within the DA sample there were 448 subjects who admitted to the use of barbiturates without prescriptions. In this study, the barbiturate sample will be used for all comparisons.

General Considerations About the Samples

The DA sample most likely has some false admissions to pre-service drug use, just as the control sample may have some unreported pre-service drug use. A review of the history of the DCO suggests that this is not a prevalent phenomenon. The lack of purity is not a major problem, for if there are impurities in the two samples, then the differences found will be understated. It is certainly likely that the two samples do differ in amount of drug usage, and it is this difference that is of importance.

AFR 30-19 is the source of definition for some of the drug terminology of this study. The term "drug abuser" is defined as "one who has illegally, wrongfully, or improperly used any narcotic substance, marijuana, or dangerous drug." The "drug abuser" is, therefore, taken to mean anyone who has been identified as having used any of the following drugs at least once:

> Canabis, including marijuana and hashish
> Amphetamines, if taken without a prescription
> Barbiturates, if taken without a prescription
> Hallucinogens, including LSD, peyote, and psilocybin
> Opiates, including heroin, codeine, morphine, and opium
> Other, including glue, cocaine, antihistamines, ether, gasoline, etc.

According to the Air Force definition, "drug abuser" is a very broad term. Therefore, the terms "user" and "abuser" will be used synonymously throughout this report.

Variables

Drug use information was available on the extent and type of drugs used. Usage of barbiturates ranged from one use to several hundred uses. Intervals were formed with the intent that there would be enough cases in each interval to make meaningful comparisons, but there would also be a wide range of intervals to facilitate observations of relationships between extent of use and other variables. A simple count of the number of categories of drugs used, regardless of extent of use of any particular drug, formed another variable of interest called " multiple use." The multiple use variable ranges from 0 to 6.

Other personal information variables available on each subject in all samples were investigated. They were:

1. Race. Negro or Non-Negro.
2. Home of record. Subjects' home of record, which was condensed into the following six groups:
   a. North Northeast. Maine, New Hampshire, Rhode Island, Vermont, Massachusetts, Connecticut, New York, or New Jersey.
   b. Mid Atlantic-North Central. Delaware, Pennsylvania, Maryland, Virginia, W. Virginia, Kentucky, or Ohio.

c. South-Southwest. Alabama, Florida, N. Carolina, S. Carolina, Georgia, Tennessee, Mississippi, Arkansas, New Mexico, Oklahoma, Louisiana, or Texas.
d. Middle West. Illinois, Indiana, Michigan, Missouri, Wisconsin, Colorado, Iowa, Kansas, N. Dakota, S. Dakota, Minnesota, Nebraska, or Wyoming.
e. Far West-Pacific Coast. Arizona, California, Idaho, Oregon, Montana, Washington, Nevada, Utah, Alaska, or Hawaii.
f. Other.

3. Armed Forces Qualification Test (AFQT) score.
4. Airman Qualifying Examination (AQE), Mechanical Aptitude Index.
5. AQE, Administrative Aptitude Index.
6. AQE, General Aptitude Index.
7. AQE, Electronic Aptitude Index.
8. Education completed (in years) at enlistment.
9. Age (in years) at enlistment.
10. Religious denomination.
11. Duty status code - indicating whether the subject is still on active duty, and if not on active duty, the type of discharge.
12. Current grade.

Analysis

Distributional analyses were used to analyze these data. Variables are distributed together to see how the variable of interest is associated with others. The analysis consisted of three parts:

1. Relationship of barbiturate use to the use of other drugs.
2. Relationship of barbiturate use and background characteristics.
3. Relationship of barbiturate use to measures of success.

The illustrations in this report are drawn to indicate relationships between use intervals of barbiturates and other characteristics. The vertical axis is a percentage scale, usually 0 to 100 percent except where the full scale would be a waste of space. Across the top of each graph are separate intervals of use (1 means one use, 2-5 means two through five uses, etc.). At the bottom of the graph are the *N*s for each interval of usage.

For example, in Figure 1 the first point on the top line indicates that 89 percent of the 100 one-time barbiturate users also used cannabis at least once. As an additional example, the third point on the top line of Figure 2 shows that of the 63 subjects who have used barbiturates between 6 and 20 times, approximately 31.5 percent were from the North-Northeast.

III. RESULTS AND DISCUSSION

The Relationship of Barbiturate Use to the Use of Other Drugs

Barbiturate only use. The bottom line of Figure 1 represents those that have used barbiturates only. Only a small percentage are one-drug users of barbiturates, but as the usage of barbiturates increases, even this small percentage is lost. It may be said, almost without exception, that those who are regular or heavy users of barbiturates are involved also in the use of other drugs.

Barbiturate use and cannabis. The most obvious relationship of barbiturates to other drugs is with cannabis. Almost 90 percent of those who experiment once with barbiturates have at least some experience with use of cannabis. The striking aspect of the cannabis curve is that there is no gradual increase in relationship. It begins high and stays high, increasing to almost 100 percent by 2 or more uses of barbiturates.

Barbiturate use and amphetamines. In much of the literature, there is a report of a cycle of drug use which includes amphetamines as uppers and barbiturates as downers (Cohen, 1969; Cohen, 1970). The steady increase in likelihood of amphetamine use in proportion to the increase in barbiturates lends support to Cohen's cyclical use phenomenon.

Barbiturate use and hallucinogens. Another strong relationship is between barbiturate use and hallucinogens. Here again, the use of barbiturates to bring someone down off a trip or a high is a possibility.

Barbiturate use and opiates. The curve for associated use of barbiturates with other drugs shows the greatest jump with opiates. Apparently, it is not uncommon to find addiction to both barbiturates and opiates (Nowlis, 1969). When street shortages occur, barbiturates are used to ease opiate withdrawal until a new supply of opiates is available. Further, some street dealers have been known to cut their heroin with

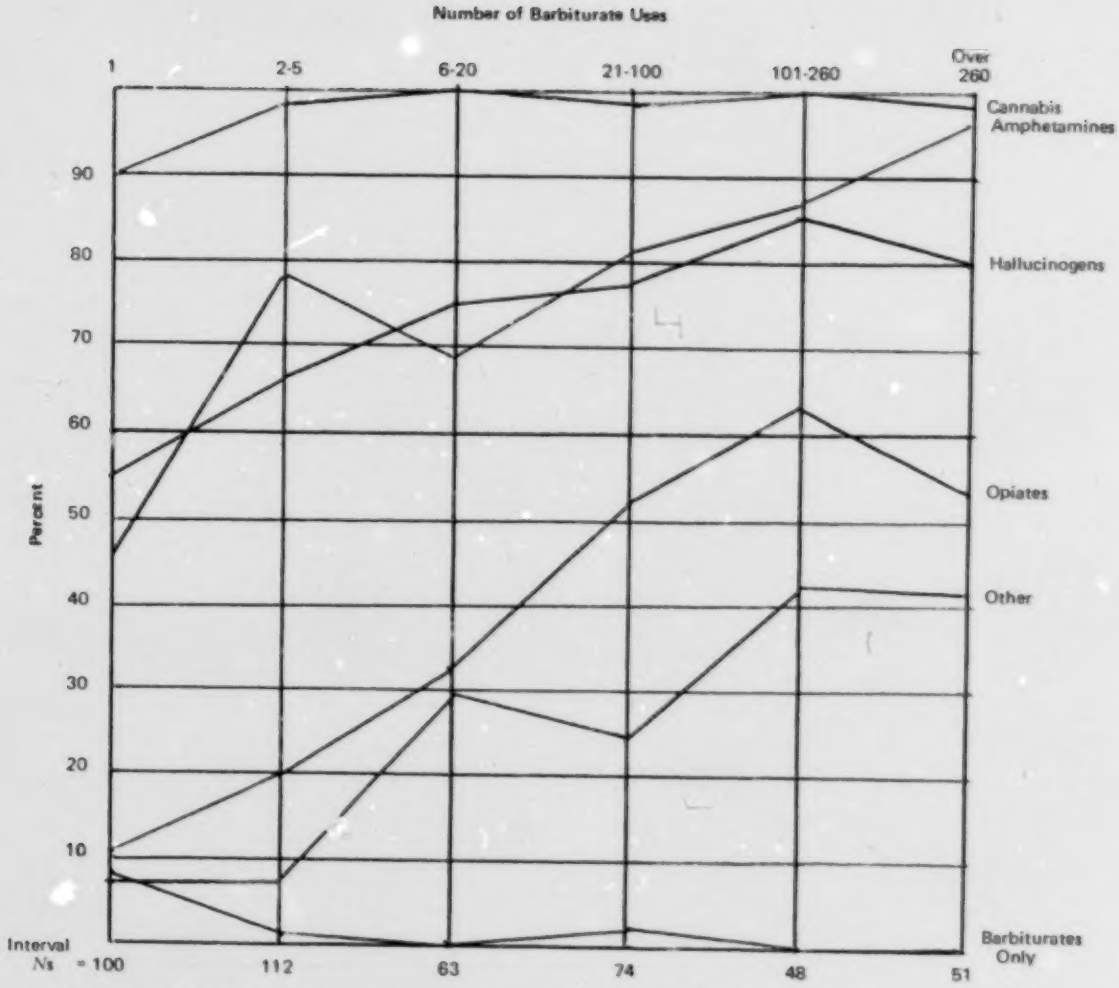

Figure 1. **Relationships between degree of barbiturate use and the use of other drugs.**

barbiturates, although the common dilutant is powdered milk or other non-drug powders.

Barbiturate use and other drugs. Relatively speaking, the relationship between barbiturate use and "Other" drugs is low, but there is a steady upward trend. This trend indicates that with heavier barbiturate use, there is more likelihood that the subject will also use drugs included in the "Other" category.

Heavy drug use. It is important to remember that Figure 1 plots the association between barbiturate use and *one or more* uses of the associated drugs. The relationships noted could indicate nothing more serious than the fact that the user of one drug is more likely to experiment with additional drugs. Table 1 gives more information as to the likelihood that heavy users of barbiturates are heavy users of drugs in the other categories. Heavy use of barbiturates is arbitrarily defined as over 100 uses, while the definitions of light and heavy use for the other drugs are given in the table under the headings "Number of Uses (Light)" and "Number of Uses (Heavy)." The intent of Table 1 data is to show that heavy use of barbiturates is very strongly related to the heavy use of other drugs. For example, of the 31 barbiturate users who used cannabis lighly (1 to 5 times) only 2, or 7.1 percent were heavy users of barbiturates. Of the 100 barbiturate users who used cannabis heavily (over 630 times) 48, or 48.0 percent were heavy users of barbiturates, a very significant difference. Reading the data in the same manner for amphetamines, hallucinogens, opiates, other and multiple use, one arrives at the same conclusion—there is a strong likelihood that if an individual becomes a heavy user of barbiturates that he will also be a heavy user of other drugs.

Table 1. **Heavy Barbiturate Users (Over 100 Uses) Who Are Light Users of Associated Drugs Compared to Heavy Users of Associated Drugs**

Associated Drug	Heavy Barbiturate Users Who Are Light Users of Associated Drugs				Heavy Barbiturate Users Who Are Heavy Users of Associated Drugs			
	Number of Uses (Light)	Total N, All Light Users	N	Percent Total N, Light Users	Number of Uses (Heavy)	Total N, All Heavy Users	N	Percent Total N, Heavy Users
Cannabis	1-5	31	2	7.1	Over 630	100	48	48.0**
Amphetamines	1-2	42	5	11.9	Over 200	70	47	67.1**
Hallucinogens	1-2	44	6	13.6	Over 150	57	28	49.1**
Opiates	1-5	54	14	25.9	Over 100	42	24	57.1**
Other	1-5	44	9	20.5	Over 40	26	18	69.2**
Multiple Use*	2-4	305	38	12.5	5-6	133	60	45.1**

*Indicates number of drugs used including cannabis; not number of uses.
**.01 level.

The Relationship of Barbiturate Use to Background Characteristics

Geographical Area of Enlistment. Table 2 compares barbiturate users with the total control sample by geographic area of enlistment. As was found among cannabis users (Mullins, Vitola, & Michelson, 1973), the percentage of barbiturate users was significantly larger from the North-Northeast and the Far West-Pacific Coast areas. There was also a significant difference between barbiturate users and control in the other three regions where the proportion of the barbiturate users is lower (.01 level) than would be expected by chance. The data of Table 2 suggest an inner-city, urban-oriented barbiturate group with a more rural-oriented control group.

Table 2. **Percentage Distributions of Barbiturate Users and Control Samples by Area of Enlistment**

Area of Enlistment	Barbiturate Users	Control Sample
North-Northeast	26.1	16.9**
Mid-Atlantic-North Central	12.9	19.9**
South-Southwest	18.5	26.8**
Midwest	14.9	23.4**
Far West-Pacific Coast	27.2	12.5**
Other	.2	.3
N	448	9378

**.01 level.

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Figures 2 and 3 graphically illustrate interval use differences between the geographic areas. The only recognizable trend is for barbiturate users from the Far West-Pacific Coast area to be less and less represented with progressively increasing degrees of use.

Race. Figure 4 is the relationship between extent of barbiturate use and race. Among the 100 subjects who have used barbiturates only one time, 12 percent are blacks. The slope of the graph appears to indicate a trend toward a slightly disproportionate number of blacks in the heavy barbiturate use intervals.

AFQT Category. Figure 5 presents AFQT mental ability categories by extent of barbiturate use. Categories I and II are those in which are found personnel of higher mental ability. It is these personnel that the Air Force assigns to its most critical jobs. The data of Figure 5 indicate a strong negative relationship between Category I and II personnel and extent of barbiturate use and a strong positive relationship between Category III and IV personnel and extent of barbiturate use.

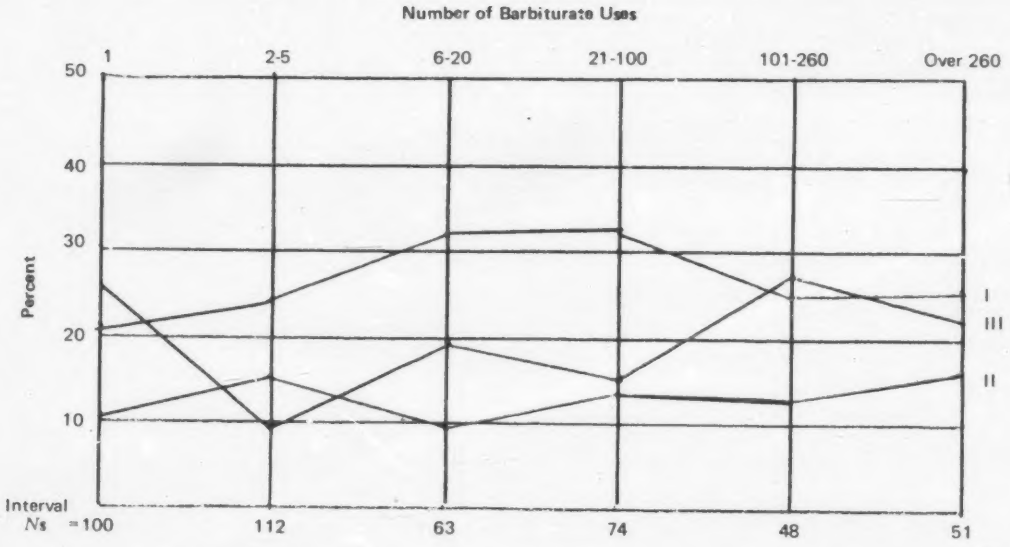

Figure 2. **Barbiturate use in the North-Northeast (I), Mid-Atlantic-North Central (II), and South-Southwest (III) enlistment areas.**

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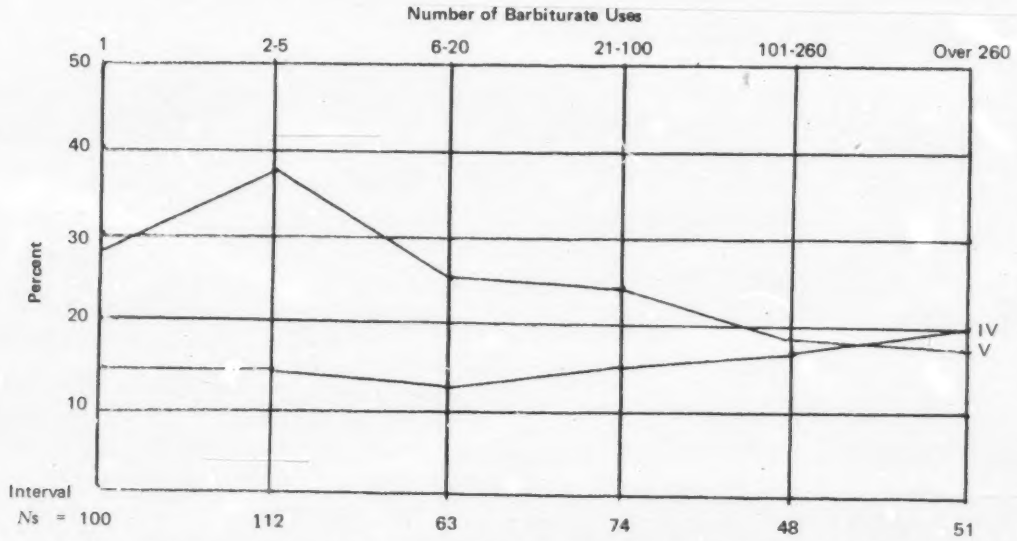

Figure 3. **Barbiturate use in the Mid-West (IV) and Far West-Pacific Coast (V) enlistment areas.**

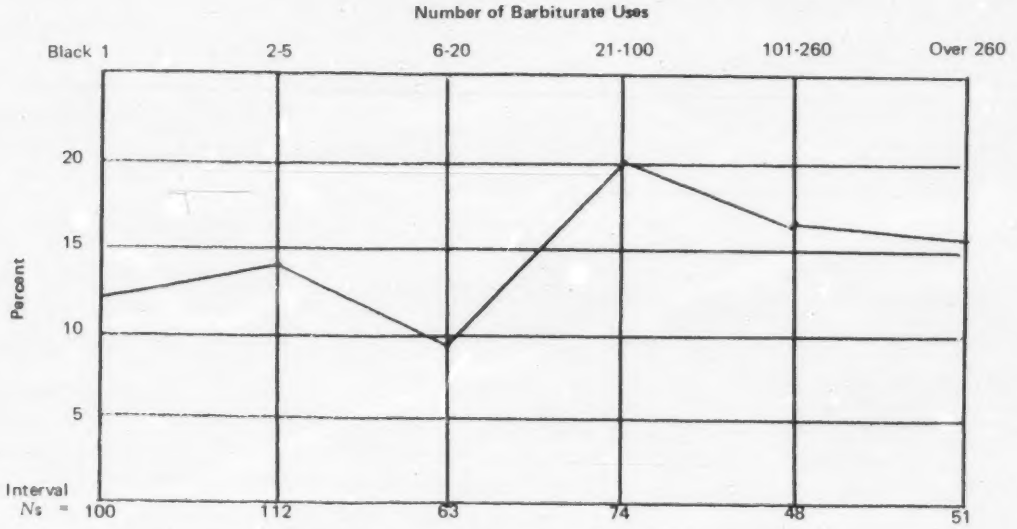

Figure 4. **Barbiturate use by race.**

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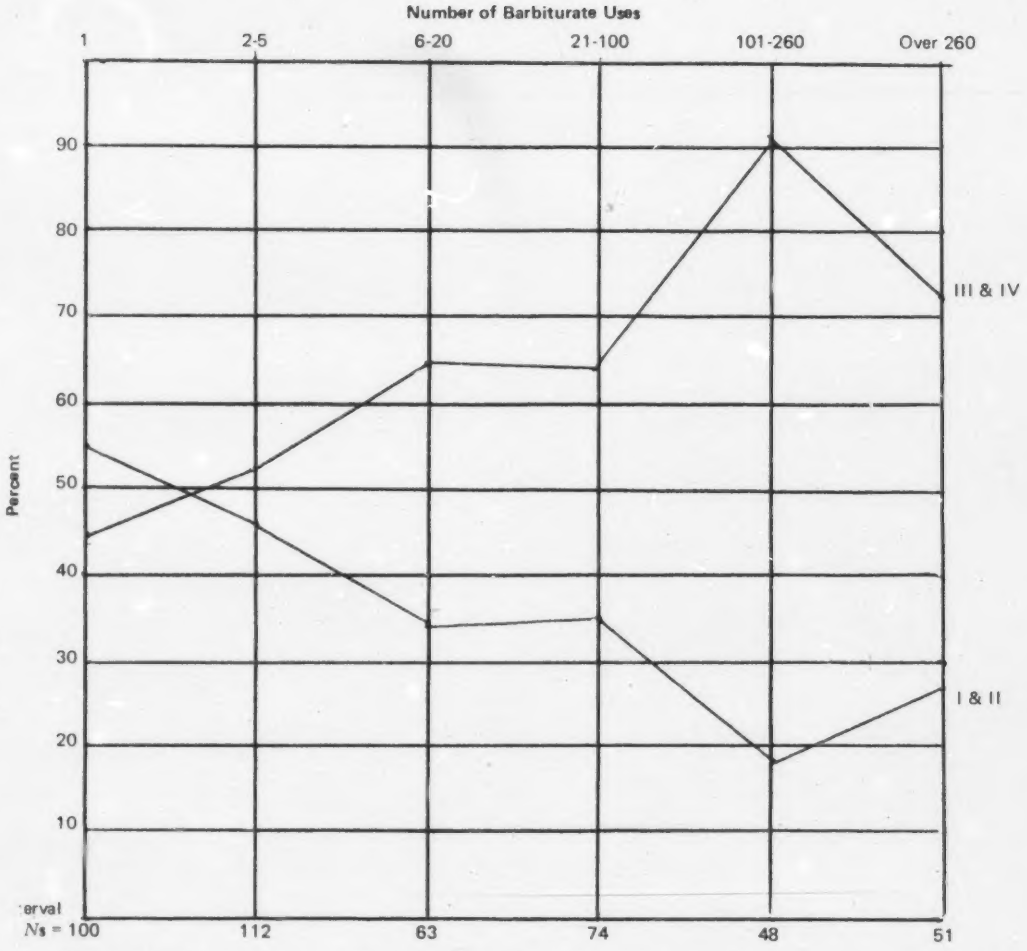

Figure 5. **Barbiturate use by AFQT; Categories I and II vs Categories III and IV.**

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AQE Scores. Figures 6 through 9 show the relationship between AQE scores and extent of barbiturate use. There is a strong negative relationship between aptitude and degree of barbiturate use. The reader is cautioned about interpretation of the figures. The *slant* of the line is the only important indication in any of the figures. As the degree of barbiturate use increases, the percent of users who score 80 and above on the aptitude indexes decreases, and the percent of users who score below 60 increases.

Figures 6 through 9 indicate that the more talented subjects who have used barbiturates tend not to use the substance very many times—whereas the reverse is true for the less talented barbiturate users.

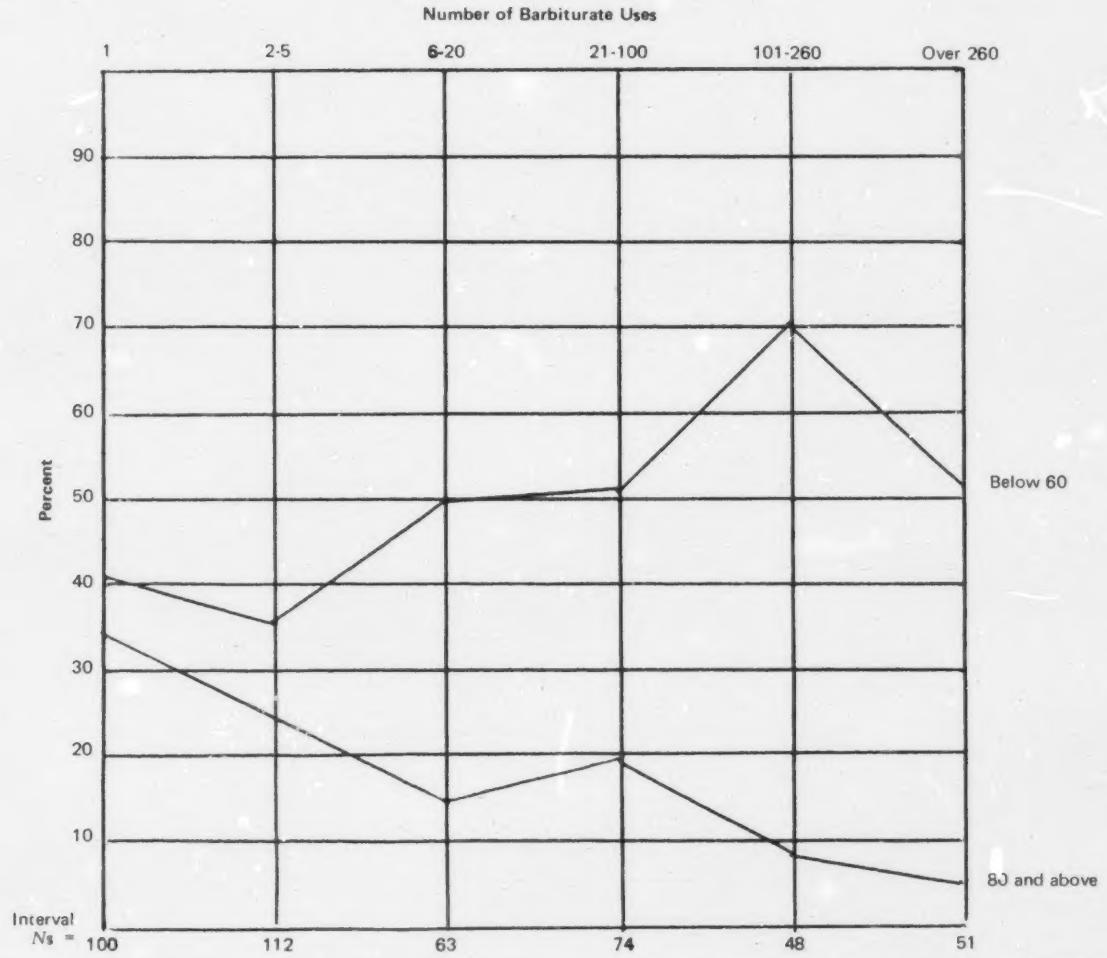

Figure 6. **Barbiturate use by AQE-M.**

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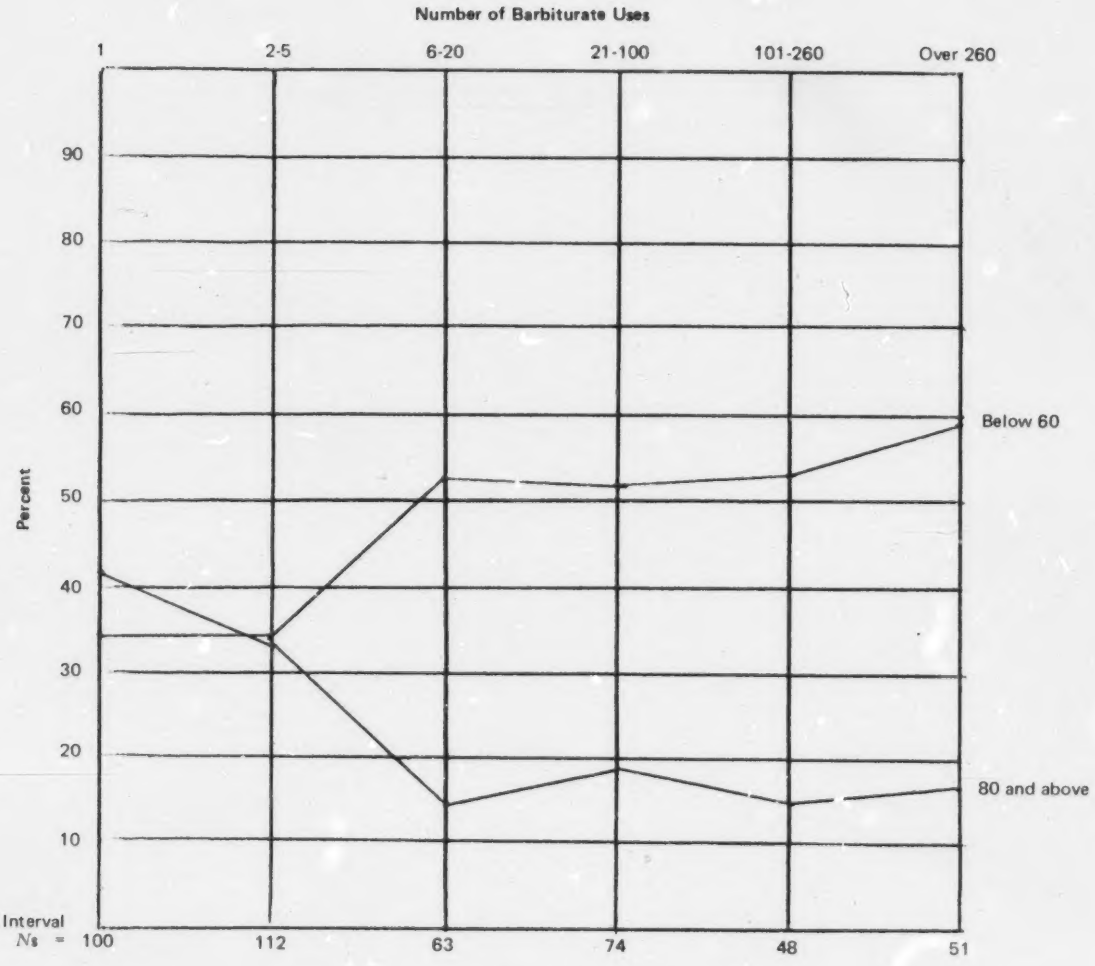

Figure 7. **Barbiturate use by AQE-A.**

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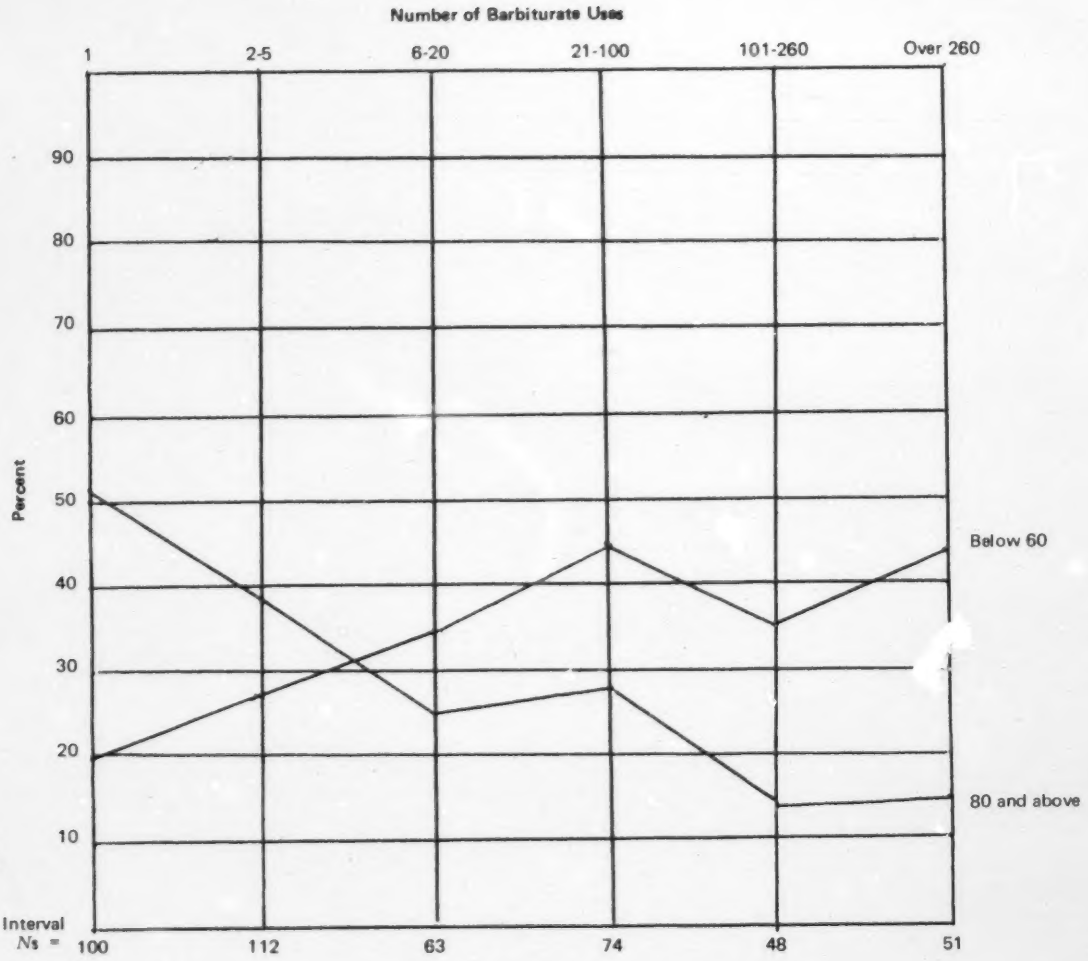

Figure 8. **Barbiturate use by AQE-G.**

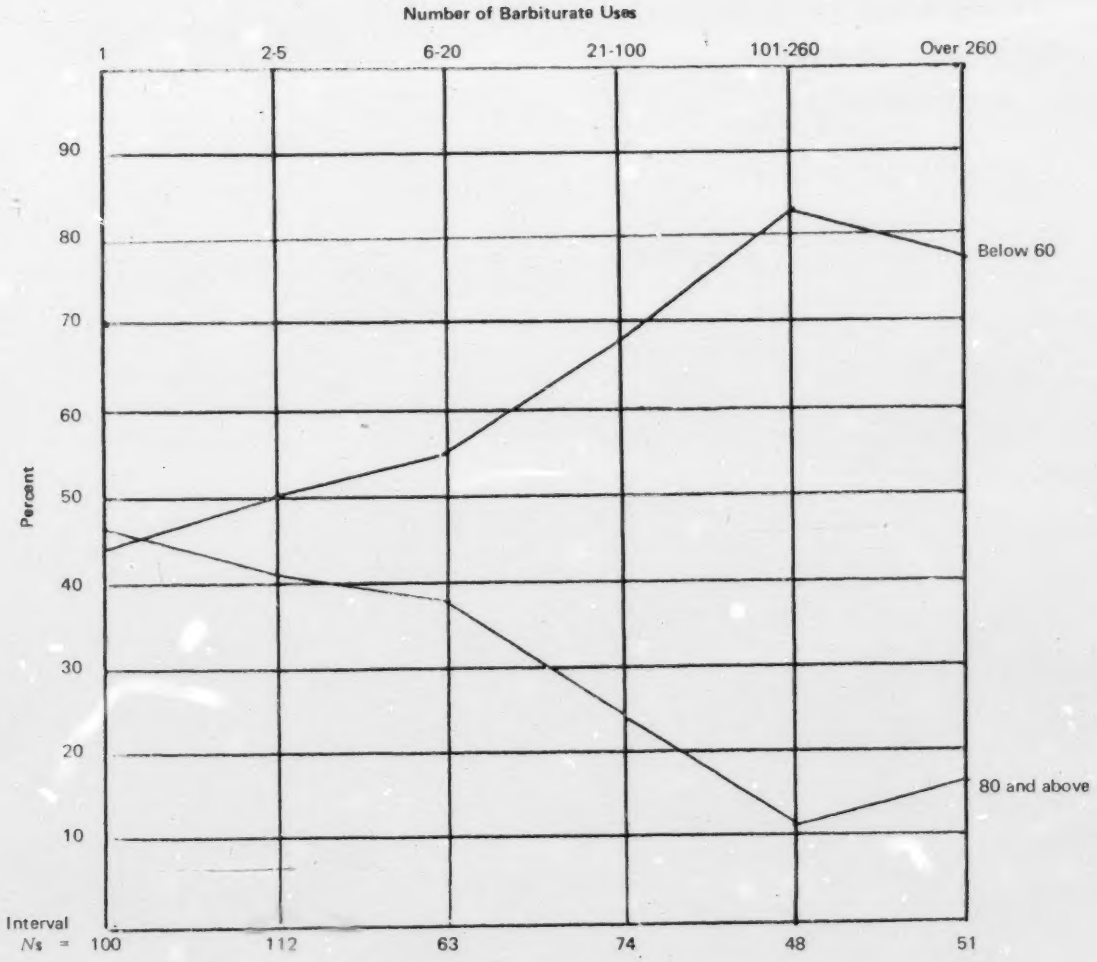

Figure 9. **Barbiturate use by AQE-E.**

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Educational Level. The data of Table 3 show the relationships between educational level and degree of use among barbiturate users. Analysis of the data results in the conclusion that, compared to his more well-educated peers, the barbiturate-using high school dropout evidences a strong trend to become progressively involved in the continued use of barbiturates.

Table 3. **Percentage Distribution of Degree of Barbiturate Use of Three Levels of Education**

Number of Barbiturate Uses	Educational Level							
	Less Than 12 years		12 years		More Than 12 years		Total	
	N	%	N	%	N	%	N	%
1	17	12.4	72	25.4	11	39.3	100	22.3
2-5	18	13.1	87	30.7	7	25.1	112	25.0
6-20	20	14.6	38	13.4	5	17.8	63	14.1
21-100	27	19.7	45	15.9	2	7.1	74	16.5
101-260	23	16.8	23	8.2	2	7.1	48	10.7
260+	32	23.4	18	6.4	1	3.6	51	11.4
Total	137	100.0	283	100.0	28	100.0	448	100.0

Age of Enlistment. Table 4 presents a comparison between barbiturate users and their control sample by age at enlistment. In the barbiturate user group, 72 percent are 19 years old or younger, while only 63 percent of the control sample are in that age group. In general, barbiturate users enlist at a younger age than do members of the control group.

Table 4. **Percentage Distribution of Barbiturate Users and Control Samples by Age at Enlistment**

Age of Enlistment	Barbiturate User	Control Sample
17	5.6	4.5
18	29.2	26.4
19	37.3	32.4*
20	18.5	17.5
21	4.7	7.4*
22	2.2	6.3**
23	1.3	3.5*
24	.7	1.3
25	.2	.4
26	.2	.1
27	0	.05
28	0	.01
19 or younger	72.1	63.3**
20 or older	27.9	36.7**
Total *N* (17 through 28)	448	9378

*.05 level.

**.01 level.

Religious Preference. Table 5 compares barbiturate users and the control sample by religious preference. The data indicate significantly more drug users are found with no religious preference or among the Jewish faith than in the control sample. Baptists and Methodists are found significantly less often among barbiturate users than in the control sample. The *N*'s of the various religious groups were too small to further break them down by use intervals. Therefore, no figures showing relationships between degree of barbiturate use and religious preference are given.

Table 5. **Comparison of Barbiturate Users and Control Samples by Religious Preference**

Religious Preference	Barbiturate User		Control Sample	
	N	%	N	%
No Preference	88	19.6	961	10.2**
Baptist	81	18.1	2,196	23.4**
Church of Christ	5	1.1	237	2.5
Episcopal	10	2.2	183	2.0
Jewish	9	2.0	51	.5**
Latter Day Saints	8	1.8	117	1.2
Lutheran	19	4.2	538	5.7
Methodist	28	6.3	1,067	11.4**
Presbyterian	15	3.3	359	3.8
Roman Catholic	131	29.2	2,383	25.4
Other	54	12.2	1,286	13.7
Total	448		9,378	

**.01 level.

The relationship of barbiturate use to measures of success. Duty status and promotion rate were used as measures of success in the Air Force. APRs were not included because there were not enough valid APRs among the subjects constituting the barbiturate sample. Any differences observed between the control group and the barbiturate group are understated since these measures were current as of July 1971. Since the last cases were collected in August of 1971, these measures were taken very early in the careers of these subjects.

Duty Status. This is a coded variable that indicates the subject's duty status, active duty or discharged, and, if discharged, what type of discharge was received. The undesirable discharges include:

1. Unsuitability - character or behavior disorders.
2. Unfitness - frequent involvement in incidents of discreditable nature with civil or military authorities.
3. Unfitness - multiple reasons.
4. Release prior to expiration of term of service, failure to meet minimum standards for retention in the Air Force. During the period of this study, discharge for drug abuse was included, along with others, in this reason for discharge.

Table 6 compares barbiturate users with the control sample by duty status. There is a significant difference between the groups on undesirable discharges. Even after the undesirable discharges have been reduced by eliminating reason 4 above, there is a significant difference. Although the differences are not large from a practical standpoint, they are statistically significant beyond the .01 level.

Table 6. **Comparison of Barbiturate Users and Control Samples by Duty Status**

	Barbiturate User		Control Sample		Reduced Sample: Barbiturate User		Reduced Sample: Control Sample	
Duty Status	N	%	N	%	N	%	N	%
Undesirable Discharge	139	31.0	141	1.5**	12	3.7	43	0.5**
Indeterminate	16	3.6	217	2.3	16	5.0	217	2.3**
To Accept Commission	0	0.0	4	0.0	0	0.0	4	0.0
Currently Active	291	65.0	9,006	96.0**	291	90.7	9,006	97.1**
Other	2	.4	10	.1	2	.6	10	.1**
Total	448		9,378		321		9,280	

**.01 level.

Promotion rate. Table 7 compares barbiturate users and the control sample by grade. Apparently, the magnitude of difference between promotion rates of users and their controls becomes evident at the Airman First Class grade level. The control group contains 23.3 percent who have been promoted to Airman First Class, while only 12.3 percent of the barbiturate users have been promoted to this grade.

Table 7. **Comparison of Promotion Rate of Barbiturate Users and Control Samples by Grade**[1]

	Barbiturate User		Control Sample	
Grade	N	%	N	%
Airman Basic	65	22.4	1,658	18.4
Airman	189	65.3	5,240	58.2*
Airman First Class	37	12.3	2,102	23.3**
Sergeant	0	0.0	0	0.0
Staff Sergeant	0	0.0	6	.1

[1] Active duty subjects only.
*.05 level.
**.01 level.

IV. CONCLUSIONS

The data indicate a strong positive relationship between use of barbiturates and the use of other

drugs. There is no "cause-and-effect" relationship in these data, but the likelihood of barbiturate use to the use of other drugs, especially cannabis, is high.

Barbiturate use is significantly more likely in the North-Northeast and in the Far West-Pacific Coast areas of enlistment.

When the barbiturate user is compared with his peers, he is found to be younger at age of enlistment, he tends to express no religious preference, and he is less likely to adapt to, and succeed in, the United States Air Force. Degree of barbiturate use is negatively associated with aptitude, and with educational level.

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